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Title: Cross antenna comprising linear sub-antennas and associated processing

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AMENDMENTS IN ACCORDANCE WITH PCT ARTICLE 19

Amendments to claims.

The claims have been amended. A new set of claims showing the amendments made is attached.
Claim 1 now specifies the calculation of normalised correlation coefficients. This amendment is supported in particular on page 11, lines 6 to 10 of the application as filed.
To respond to the objection with regard to clarity, the term "predetermined threshold" has been replaced with "detection threshold" in claim 1. The detection function of the threshold is supported in particular on page 6, lines 6 to 15 of the application as filed.
The term "associated predefined threshold" has been replaced with "associated target detection threshold" in claim 2. The function of this threshold is already clear from the claims of the application as filed.

The amendments clearly comply with the provisions of PCT Article 19(2).

Novelty

The subject matter of amended claim 1 is novel over each of the cited documents, in particular document D1.
Indeed, at least one claimed feature is not described in D1.
The subject matter claimed relates in particular to the calculation of normalised correlation coefficients. D1 does not describe the calculation of a normalised correlation coefficient.
In addition, the object detection device claimed performs a comparison between a normalised correlation coefficient and a detection threshold. D1 describes only the presence of a detection device, but gives no indication concerning its relationship with the correlation calculations performed.
Consequently, the subject matter of claim 1 is clearly novel over document D1.

Inventive step

The claimed invention involves an inventive step.
The claimed invention defines in particular the calculation of normalised correlation coefficients. As mentioned on page 11, lines 9-10, this feature makes it possible in particular to detect a target without being concerned about the differences in levels between the signals from the two line portions.
None of the prior art documents describes the calculation of normalised correlation coefficients. Consequently, the subject matter claimed cannot be derived in an obvious manner from the prior art.

Clarity

The objections with regard to claims 1 and 2 were discussed above.
The applicant provided, in an annex, a definition of the inflection point of a curve, from an online encyclopaedia. Therefore, claim 9 indeed defines a limitation regarding the shape of the line portions. As the definition of the inflection point of a curve is clear to a person skilled in the art, the applicant considers it to be unnecessary to include an additional precision on this subject in claim 9.

Conclusions

In view of the amendments and the justifications provided, the applicant considers the subject matter claimed to satisfy the requirements for patentability defined by the PCT.

AMENDED CLAIMS

1. Antenna (1) characterised in that it includes:
- a first (2) and a second (3) linear sub-antenna:
    - each having a plurality of sensors (21-2M, 31-3N) arranged so as to form first and second line portions, respectively, with each sensor generating a basic signal (Si', Gj');
    - wherein the angle between respective directional vectors of the first and second tangents to the midpoint respectively of the first and second line portions is between 30° and 150°;
- an antenna processing device (4, 5) forming a plurality of combined signals (VSi, VGj) for each line portion, which signal is a combination of basic signals from the sensors of this line portion;
- a signal processing device (6, 7) generating useful combined signals (TSi, TGj) by filtering the noise of the combined signals coming from each line portion;

- a device (8) for calculating normalised correlation coefficients ($[C_{ij}]$) between the useful combined signals of the first line portion and the useful combined signals of the second line portion;

- a device (8) generating a detection signal ($[R_{ij}]$) when a normalised correlation coefficient exceeds a detection threshold.

2. Antenna according to claim 1, characterised in that it also includes a target detection device, comparing each calculated normalised correlation coefficient with an associated target detection threshold, detecting and locating a target when a correlation coefficient exceeds said associated threshold.

3. Antenna according to claim 2, characterised in that it includes a processing device (9) for processing the detection signal and the correlation coefficients generating information concerning the detected target.

4. Antenna according to claim 3, characterised in that the information generated includes the distance, the elevation angle, the bearing and the speed of the target.

5. Antenna according to claim 3 or 4, characterised in that it includes a device (10) displaying the information generated.

6. Antenna according to any one of the previous claims, characterised in that each sensor includes a plurality of elementary sensors selected from the group consisting of radar, radioelectric and electromagnetic sensors, hydrophones, transducers, microphones,

ultrasound sensors, accelerometers, and optical and infrared sensors.

7. Antenna according to claim 6, characterised in that:

- the elementary sensors are transmissive;

- the data processing device processes the combined signals according to the signal transmitted by each sensor, which processing includes, for example, a pulse compression.

8. Antenna according to claim 6, characterised in that it also includes a transmitter, wherein the data processing device processes the combined signals according to the signal transmitted by the transmitter, which processing includes, for example, a pulse compression.

9. Antenna according to any one of the previous claims, characterised in that the first and second line portions are curves without an inflection point.

10. Antenna according to any one of the previous claims, characterised in that the first and second line portions are straight and oriented respectively in elevation angle and bearing.

11. Antenna according to clam 10, characterised in that the straight line portions are not parallel.